

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



# (12) UK Patent Application (19) GB (11) 2 302 025 (13) A

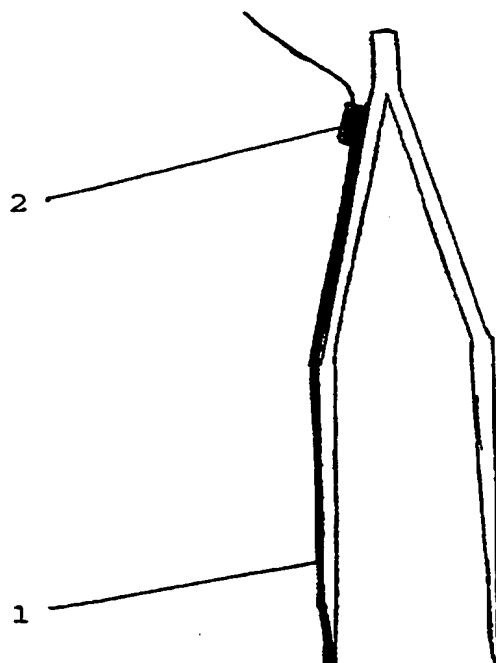
(43) Date of A Publication 08.01.1997

(21) Application No 9511829.5	(51) INT CL <sup>6</sup> A61B 17/28
(22) Date of Filing 10.06.1995	(52) UK CL (Edition O ) A5R REP
(71) Applicant(s) <b>Mark Steven Whiteley</b> 14 Horwood Close, Headington, OXFORD, OX3 7RF, United Kingdom	(56) Documents Cited US 4982724 A                    US 4558706 A
(72) Inventor(s) <b>Mark Steven Whiteley</b>	(58) Field of Search UK CL (Edition N ) A5R REP REYX INT CL <sup>6</sup> A61B 8/00 8/06 17/22 17/225 17/28 ONLINE: WPI
(74) Agent and/or Address for Service <b>Mark Steven Whiteley</b> 14 Horwood Close, Headington, OXFORD, OX3 7RF, United Kingdom	

## (54) Vascular doppler forceps

(57) Dissecting forceps combined with a Doppler ultrasound transmitter/receiver enabling the forceps to be used as a Doppler probe. Blood flow and therefore blood vessels can be identified non-invasively during an operative procedure using these forceps, which are being used simultaneously for tissue manipulation.

Figure 1



GB 2 302 025 A

1/2

Figure 1

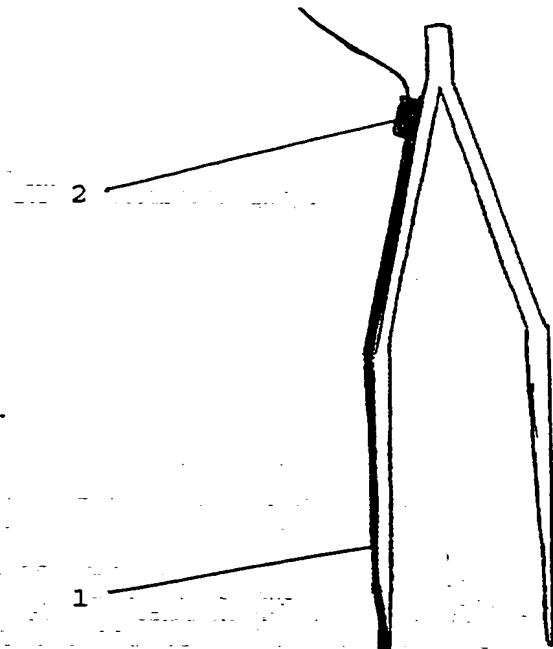
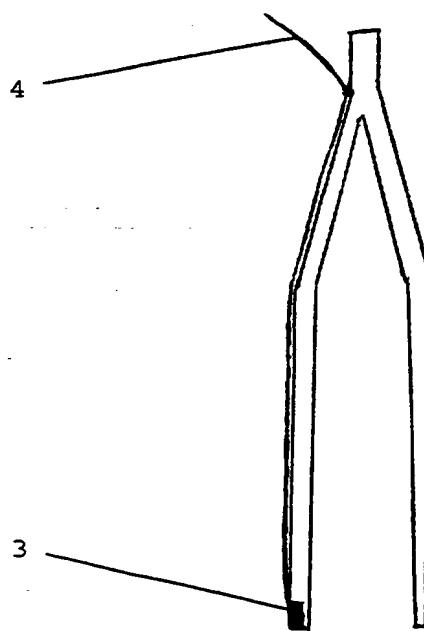
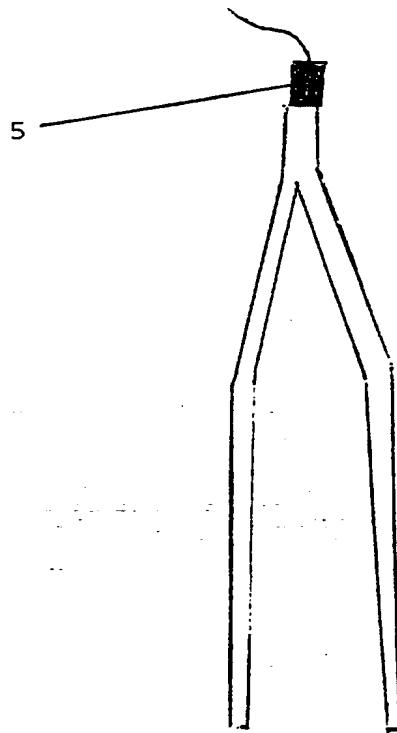


Figure 2



2/2

Figure 3



**2302025**

1

**VASCULAR DOPPLER FORCEPS**

This invention relates to dissecting forceps which incorporate equipment for Doppler ultrasound transmission for the non-invasive detection of blood flow.

Dissecting forceps are used to manipulate tissues when operating on humans and animals. They are used in many fields including human surgery, veterinary surgery, animal research and biology experiments. During such operations blood vessels (arteries or veins) have to be identified, either to avoid them in order to prevent haemorrhage, or to accurately locate them for a purpose such as vessel biopsy, cannulation or direct procedures to the vessel.

In many instances vessels are difficult to identify by direct vision or digital palpation. Often a hand held Doppler probe is used to identify the position of such vessels. However such probes are difficult to use in sterile conditions, necessitating the time consuming preparation of the probe by insertion into a sterile bag with contact gel and requiring an assistant to control the Doppler unit.

According to the present invention there is provided a dissecting forceps that contains elements allowing transmission of Doppler ultrasound through one or both tips, so that the forceps can be used as a Doppler probe to identify blood flow whilst simultaneously being used as dissecting forceps.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawing in which:

Figure 1 shows dissecting forceps with a channel within one tip carrying an element that transmits the Doppler ultrasound

Figure 2 shows dissecting forceps with a Doppler transmitter/receiver built into one tip

Figure 2 shows dissecting forceps with a Doppler transmitter/receiver attached directly to the forceps.

Referring to the drawing the dissecting forceps carry the Doppler signal from the ultrasound transmitter/receiver to the tissue and then carry the reflected signal back to the transmitter receiver. This can be performed in several ways, examples of some are

shown in Figures 1, 2 and 3.

Figure 1 shows the forceps carrying an element 1 that transmits ultrasound being used as a conductor from the ultrasound transmitter/receiver 2 to the tissue. Figure 2 shows a small ultrasound transmitter/receiver 3 built into one of the tips of the forceps with a wire 4 transmitting the electronic signal to the Doppler circuits. Figure 3 shows a ultrasound transmitter/receiver 5 attached directly to the dissecting forceps.

**CLAIMS**

1 Dissecting forceps that are combined with a Doppler ultrasound transmitter/receiver in order to detect blood flow with the forceps whilst using them during an operative procedure.

2 Dissecting forceps as in Claim 1 wherein the ultrasound transmitter/receiver is attached to a conducting element which is supported in some way by the forceps, so that the Doppler ultrasound signal is transmitted to the tissues.

3 Dissecting forceps as in Claim 1 wherein the ultrasound transmitter/receiver is incorporated within the tip of the forceps allowing direct transmission to the tissues.

4 Dissecting forceps as in Claim 1 wherein the ultrasound transmitter/receiver is attached directly to the forceps allowing the forceps themselves to be used as an ultrasound conducting element, transmitting the signal to the tissues.

Patents Act 1977  
 Examiner's report to the Comptroller under Section 17  
 (The Search report)

5

Application number  
 GB 9511829.5

**Relevant Technical Fields**

(i) UK Cl (Ed.N) A5R (REP, REYX)  
 (ii) Int Cl (Ed.6) A61B 8/00, 8/06, 17/22, 17/225, 17/28

**Databases (see below)**

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) ONLINE: WPI

Search Examiner  
 MR N A FRANKLIN

Date of completion of Search  
 14 SEPTEMBER 1995

Documents considered relevant following a search in respect of:  
 Claims :-  
 1-4

**Categories of documents**

X:	Document indicating lack of novelty or of inventive step.	P:	Document published on or after the declared priority date but before the filing date of the present application.
Y:	Document indicating lack of inventive step if combined with one or more other documents of the same category.	E:	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A:	Document indicating technological background and/or state of the art.	&:	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
A	US 4982724	(SAITO et al) note column 4 line 159 - column 5 line 30	
A	US 4558706	(NAKADA et al) note column 1 lines 11-17	

**Databases:** The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

T12 - 23150

Page 1 of 1